

**2002**

COMMERCIAL TECHNOLOGY PROGRAM  
PERFORMANCE AND IMPACT REPORT



**PIONEERING THE FUTURE**  
**THROUGH INNOVATION AND COLLABORATION**



The Commercial Technology Office works with its affiliates,  
NASA programs, and GRC scientists and engineers to create:

Innovative Research

Partnerships with Industry & Government

Opportunities with Small Business

Licenses and Export Control



### **NASA GLENN TEAM RECEIVES NATIONAL RECOGNITION!**

In January 2003, the U.S. Department of Commerce recognized the NASA Glenn Commercial Technology Program as one of eight exemplary models in the nation. The honor was bestowed by a national advisory committee composed of federal laboratory and economic development professionals. It was based on the CTO's innovative and exemplary initiatives that contribute to local and regional economic development, and will serve as examples for other labs. **Congratulations team!**



## Government/Industry Collaboration Can be a Formula for Success

This is absolutely true if each does what it does best. The NASA Commercial Technology Program has consistently sought to bring the capabilities and needs of government together with those of industry — seeking innovative solutions and creating the opportunity for the transfer of technology with the private sector. Where there are technology gaps, we look for opportunities to collaborate, leverage resources, and develop the necessary technologies and products.

This report highlights the progress and impact of those collaborations. Some notable examples include:

- **First FAA-approved aircraft ice protection system in 40 years**
- **Increase in joint funded R&D in 2002 to \$44M, nearly double of last year**
- **Business and economic impact of 27 new products and \$11.7 M in new sales**
- **Significant increase in patent licensing with a strong emphasis on export control**

I would especially like to thank the Commercial Technology Team of GRC personnel, the Regional Technology Transfer Center, and the LIFT incubator for a job well done.

Dr. Larry A. Viterna  
Chief, Commercial Technology Office

# INNOVATIVE RESEARCH

## SMALL BUSINESS INNOVATION RESEARCH PROGRAM

### A WINNING PROGRAM FOR NASA

This year the GRC SBIR Program impacts all five NASA strategic enterprises. This exceptional accomplishment within NASA is a result of a strategic focus by the GRC SBIR program managers. The most recent sub-topic lead areas added at GRC include:

- Cross-Disciplinary Physical Sciences
- Biomedical and Human Support Research
- Biomolecular Systems and Technology
- Deep Space Propulsion

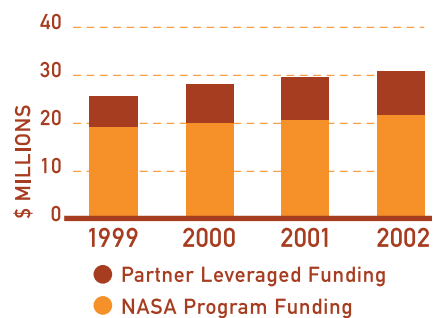
Besides cutting-edge research, NASA benefits from commercial investment in Phase III. On average this amounts to an additional 39% funding leverage.

### A WINNING PROGRAM FOR SMALL BUSINESS

Much like an early stage investor, the SBIR program provides working capital to small research and development companies, allowing them to:

- Satisfy NASA as a customer of innovative research
- Leverage NASA and additional investment funding
- Build their expertise by working with NASA researchers
- Contribute to the U.S. technological and economic base

### SBIR FUNDING





**INTERAGENCY COOPERATION**

Each year NASA GRC works with the Air Force and the Ohio Department of Development to co-sponsor a statewide SBIR conference. The “2002 Ohio Small Business Technology Conference” was held on October 10 and 11 in Dublin, Ohio. In October of 2003, NASA GRC will co-sponsor the National SBIR Conference.

**SMALL BUSINESS TECHNOLOGY TRANSFER PROGRAM**

The STTR Program facilitates the transfer of technology developed by a university research institution through the partnership of a small business concern. GRC participates in this program every other year. Performance under six 2001 Phase I Awards occurred this year in turbomachinery, advanced materials, and emissions reduction.

**NASA GRC SPINOFF COMPANY LEVERAGES SBIR & OHIO FUNDING**

Essential Research Inc. developed materials for highly efficient microelectronics, optics, and photonics under SBIR. Located within a few miles of GRC, the company created a clean room and unique research equipment after receiving \$218K from the Ohio Department of Development. It also was honored with Ohio's Emerging Technology Award.

**FIRST FAA-APPROVED AIRCRAFT ICE PROTECTION SYSTEM IN 40 YEARS**

With the help of SBIR & GRC Icing Research, Cox and Company developed a practical, low power ice-protection system. The system combines a GRC-developed mechanical de-icer with an anti-icing system. Now in production for Raytheon Aircraft's Premier I six-passenger business jet, it has also been selected for the VisionAire Vantage business jet.

**NEW FUEL CELL FOR SPACE FLIGHT AND EARTH APPLICATIONS**

NASA has depended on fuel cells for power since the beginning of human space flight. Now fuel cells are being considered for aircraft and terrestrial use as well. With support from SBIR, Technology Management Inc. has developed a very high efficiency fuel cell. Its impact was recognized in 2002 with Ohio's Emerging Technology Award.

**LOW COST RHENIUM FOR SPACE AND EARTH SCIENCE APPLICATIONS**

NASA and DoD require low cost rhenium for many applications. Using SBIR funding, Rhenium Alloys, Inc. of Elyria, Ohio, has developed cold isostatic pressing of rhenium powder to a near net shaped combustion chamber. General Dynamics and TRW are preparing for flight-testing of devices using the material.

## PARTNERSHIPS WITH INDUSTRY & GOVERNMENT

### SPACE ACT AGREEMENTS

NASA partnerships are most frequently formalized by Space Act Agreements. At GRC the Commercial Technology Office facilitates all Space Act Agreements, which are the only mechanism for industry or another government partner to sponsor R&D at NASA.

#### JOINT R&D FUNDING DOUBLES AGAIN IN 2002

- Total value of \$44M from 144 partnerships
  - \$24M NASA Program Investment
  - \$20M partner funding into NASA
  - 10% partnerships with government agencies
  - 40% partnerships in Ohio

The above does not include internal or in-kind funding by our partners that results in additional benefit to NASA.

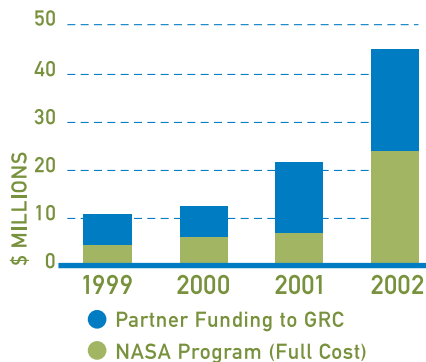
#### MORE SATISFIED CUSTOMERS USING E-GOVERNMENT

Already recognized by the Agency for its effectiveness and excellent customer satisfaction, the team continues to improve the process and increase the number of partnerships.

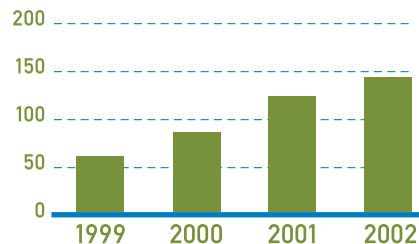
Enhancements this year include:

- Full implementation of SAAM, a web-based Space Act Agreement Maker and a CTO innovation
- Increased use of the one-page Simplified Tech Transfer Agreement, another CTO innovation

#### R&D PARTNERSHIP FUNDING



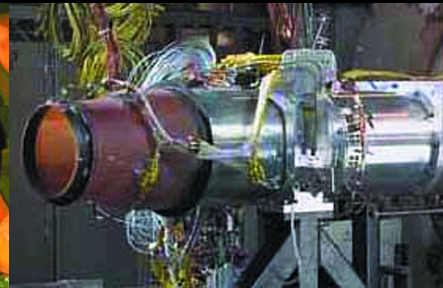
#### NUMBER OF SPACE ACT AGREEMENT PARTNERSHIPS



## COMMERCIAL TECHNOLOGY FUND

One of CTO's most successful initiatives for fostering innovation, this internal "venture fund" targets NASA patented technologies through an annual competition among GRC engineers and scientists

- Requires commercial partner willing to invest matching resources
- Funds researchers for "full cost" expenses leading to patent licenses
- \$1M of corporate and NASA funding is invested each year



### THE AIRFORCE RESEARCH

**LABORATORY** is a long-time partner with GRC in the areas of space and aeronautics power and propulsion. The Air Force Versatile Affordable Turbo Engine program is one partnership out of almost \$20M in joint efforts over the past 5 years. The VATE program is designed to improve performance, reduce cost, improve fuel efficiency, and expand the flight envelope.

### THE JOHN GLENN BIOMEDICAL ENGINEERING CONSORTIUM

was created this year with the Cleveland Clinic Foundation and other research institutions. This effort focuses on studying health issues and providing remote medical care. In another effort, the Department of Defense Health Research Program provides funding for a collaboration of GRC and the Cleveland Clinic on soft tissue modeling for telemedicine and surgical simulation.

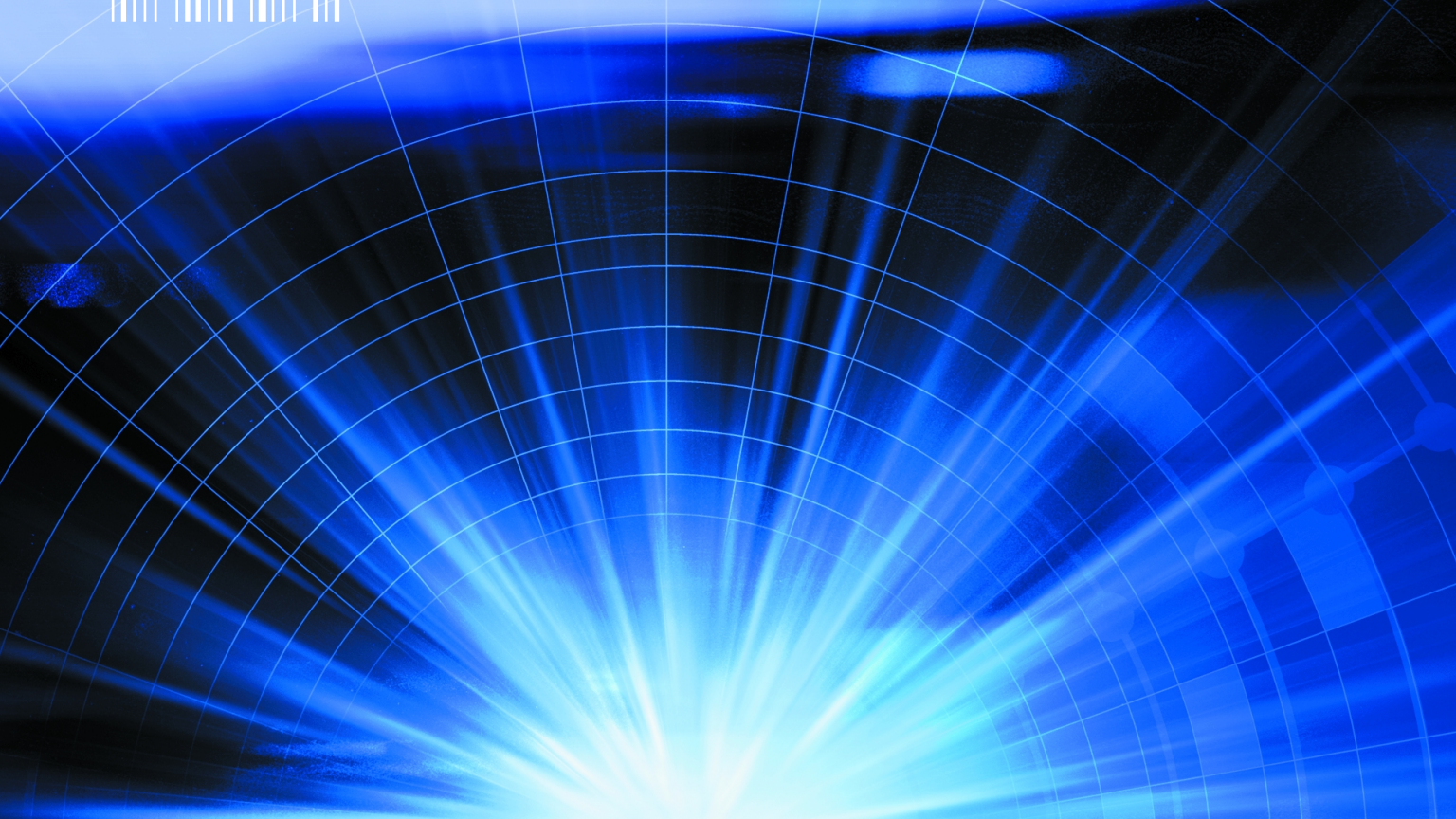
### NASA'S ULTRA-EFFICIENT ENGINE

**PROJECT** is collaborating with the Commercial Technology Office and the National Technology Transfer Center (NTTC) in Wheeling, West Virginia, to evaluate its technologies, facilities, and expertise. The goals of this effort are to identify non-aerospace partners to co-develop technologies of value to the project, and to transfer technology into additional markets to reduce costs.

### WILLIAMS INTERNATIONAL,

a manufacturer of commercial and military small turbine engines, is conducting performance tests on three engines at GRC. Test data is important to NASA's efforts to improve safety and efficiency of general aviation business aircraft. Total funding to NASA under the reimbursable Space Act Agreement is currently estimated at nearly \$3M.





## **OPPORTUNITIES WITH SMALL BUSINESS**

### **REGIONAL TECHNOLOGY AND ECONOMIC INITIATIVES**

The NASA Glenn Research Center fosters innovation and economic development through a comprehensive program of business incubation, technology business assistance, and strategic technology alliances. These successful initiatives have attracted over 30 percent of additional funding from State of Ohio and other sources.

#### **DRIVING INNOVATION**

Small businesses are a cost effective source for many of NASA's technologies needs. CTO studies of invention disclosures show:

- **Small business generates four to six times as many inventions as does large business for the same R&D funding**

#### **DRIVING ECONOMIC IMPACT**

The economic benefits returned from these initiatives are several times greater than NASA's investment.

#### **2002 IMPACT**

- **10 new startups and incubation of an additional 8 companies**
- **27 new products**
- **\$11.7M in new sales and \$5.9 M in cost savings**
- **\$5.4 M in investment and grant funding**



### REGIONAL TECHNOLOGY TRANSFER CENTER

Operated by Battelle GLITeC, NASA's Midwest RTTC supports all activities of the Commercial Technology Program, including SBIR, NASA enterprise support, and patent licensing. GLITeC, however, provides a key interface between small business and NASA through specialized programs such as:

#### Garrett Morgan Commercialization Initiative

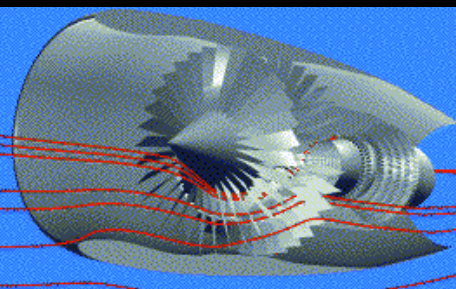
GMCI is especially designed to meet the needs of minority- and women-owned small businesses. It provides unique services that enable companies to grow or strengthen their business by leveraging NASA technology, expertise, and programs.

### LEWIS INCUBATOR FOR TECHNOLOGY

Managed by Enterprise Development, Inc., LIFT is GRC's technology business incubator. Our partners, the State of Ohio, EDI, and industry, provide leveraged funds of nearly half the operating expenses. It is significant that half of LIFT tenant companies have been minority- or women-owned businesses.

### GLENNAN MICROSYSTEMS INITIATIVE

This public/private venture was started as a challenge from the NASA Administrator, and was created by GRC, CTO, and GLITeC. GMI develops microsystem applications using the expertise, technologies, and facilities of GRC and Case Western Reserve University.



#### NASA SPINOFF BECOMES SUPPLIER

Started by a NASA retiree, AP Solutions, Inc. entered the LIFT incubator in 1999. This minority-owned company specializes in computational fluid design simulations for advanced propulsion systems. AP Solutions has been highly successful in obtaining contracts with government and industry, including an SBIR Phase I award. The company has now grown to 15 employees.

#### NEW PERSONAL SECURITY PRODUCT

Logical Services, Inc., a woman-owned company located in a Cleveland Empowerment Zone, developed the FLASHCON III, a portable wireless handheld security device, with help from NASA and the Garrett Morgan Commercialization Initiative. NASA provided expertise and access to the specialized capabilities of the Glenn/Cisco Systems Mobile Router Van for testing of the device.

#### NEW MICROSYSTEM COMPANY

FiberLead, a new business based in part on NASA technology, was launched with help from the Glennan Microsystems Initiative (GMI). FiberLead develops optical connectors for telecommunications. GMI provided a portion of the first round of funding to create a new standard for manufacturing silicon carbide microsystems. This technology is of interest to both NASA and Cleveland area manufacturing.

#### DRUG DISCOVERY WORKSTATION

The first tenant in the LIFT incubator, Analiza, designs and manufactures automated systems for rapid early drug-discovery screening by major pharmaceutical companies. The company has received additional funding from NIH and has now graduated from the NASA incubator. The company founder, a NASA engineer, has now started a second biomedical company. Total employees have grown to 11.



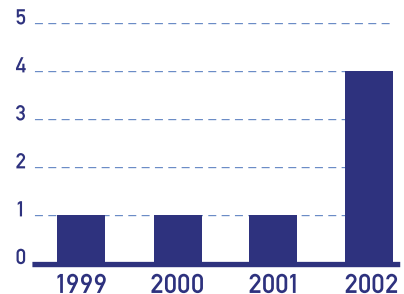
## LICENSES AND EXPORT CONTROL

### PATENT LICENSES INCREASE DRAMATICALLY

This significant increase is the result of a new initiative in 2002 by the Commercial Technology Office. Prior emphasis at the Center focused primarily on government use and release to principal contractors or grantees. The new initiative involves a Center-wide effort led by CTO and the Chief Counsel Office, which encompasses the following changes:

- Creation of an intellectual property management team
- Strategic decision making on pursuing patents
- Forming GRC / RTTC patent licensing teams
- Center-wide funding and outsourcing patent prosecution

PATENT LICENSES



### SOFTWARE LICENSING INCREASES AS A RESULT OF E-GOVERNMENT

A significant focus this year was the development of an electronic Agency-wide software release and licensing process with ready access to both NASA and non-NASA customers.

### EXPORT CONTROL

Protecting the U.S. from loss of sensitive technology is a cornerstone of NASA intellectual property management. The CTO develops and oversees export control policy and procedures at the Center by leading an outstanding team of technical and program representatives.

### DIEBOLD LICENSES NASA TECHNOLOGY

Diebold, Inc. of North Canton, Ohio, has developed "Accutrack," a new color, digital video recorder surveillance product after licensing GRC's Video Event Trigger and Tracking System. Accutrack has been installed at numerous banks, reducing the time to perform many surveillance issues from days to seconds.



### ADMA SHIPS NEW PRODUCT UNDER NASA LICENSE

NASA PS300 composite can be used as a coating to increase the life of foil bearings in oil-free systems. After receiving a license from NASA, ADMA of Twinsburg, Ohio, developed a new bearing product. The new bearing has proved to substantially reduce the maintenance of machines at Lincoln Electric.

## INNOVATION AWARDS

It is important to recognize those individual innovators and teams who have successfully "Pioneered the Future." The Commercial Technology Office promotes and coordinates the following innovation awards:

### CONGRATULATIONS TO THE 2002 AWARD WINNERS!

#### NASA GOVERNMENT INVENTION OF THE YEAR

Hollow cathode technology protects the International Space Station from the dangers of electrical charge.

#### NASA SPACE ACT AWARD

Coatings now in place on the solar array blankets on the International Space Station significantly prolong the life to 15 years. This is one of the largest Space Act awards in the history of GRC.

#### NASA SOFTWARE OF THE YEAR (RUNNER UP)

Microgravity Analysis Software System (MASS) software assures accurate and timely measurement of vibrations on the International Space Station.

#### R&D 100 AWARDS

The R&D 100 Awards are known as the "Oscars of Invention." GRC ranks in the top 10 of over 600 federal laboratories. GRC has now received 83 of NASA's 118 R&D 100 awards. Glenn's winning products in 2002:

- Ring cusp ion engine
- Ecoceramics
- A multi-layered coating for ceramics
- Long lasting silicon carbide fiber

#### NORTECH/EDI AWARDS

- Numerical Propulsion System Simulation
- Environment Conscious Ceramics (Ecoceramics)



**THANK YOU TO THE FOLLOWING  
PARTNERING ORGANIZATIONS:**

BioEnterprise, Inc.  
CAMP, Inc.  
Cleveland Engineering Society  
Cleveland Tomorrow  
Edison Biotechnology Center  
Greater Cleveland Growth Association  
Greater Cleveland Minority Technology Council  
NEOSA  
NorTech  
National Technology Transfer Center  
OAI  
Ohio Department of Development



For additional information on  
NASA partnering opportunities,  
see <http://technology.grc.nasa.gov>  
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